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express the relation of this body to hydrogen, the unit of the scale. For since in sulphuretted hydrogen the hydrogen is not altered in bulk by the sulphur it holds in solution, the increase of weight shows the proportion of sulphur combined. And so likewise in sulphurous acid gas, the bulk is not greater than that of the oxygen which it contains; and since the specific gravity is double that of oxygen, the increase proves that sulphur, in this instance, has combined with an equal weight of oxygen. When sulphur combines with a larger proportion of oxygen, the presence of water appears to be requisite as the medium of union. In the phosphoric acid, on the contrary, water is not necessary for uniting the full proportion of oxygen with which phosphorus is capable of combining.

With respect to the water that has been observed to be retained by many earths, and metallic precipitates, it is remarked, that this is probably combined with them in definite proportion, and that the presence of the water has considerable influence on their colours, and on other properties.

On a new detonating Compound: in a Letter from Sir Humphry Davy, LL.D. F.R.S. to the Right Hon. Sir Joseph Banks, Bart. K.B. P.R.S. Read November 5, 1812. [Phil. Trans. 1813, p. 1.]

The present account is intended as a caution to others against the dangerous effects of the very explosive detonation, by which the author has himself been a sufferer. His attention was first directed to the subject by a letter received from France, mentioning that about twelve months since, a compound had been discovered of azote with chlorine, which appears in the form of an oil heavier than water, and which explodes, by a gentle heat, with all the violence of the fulminating metals. The letter adds, that this discovery cost the operator an eye and a finger. Since the letter contained no account of the mode of preparing the compound, and as none could be found in any of the French journals, Sir Humphry Davy pursued a hint given him by Mr. Children, who informed him that his friend Mr. Burton had, in the month of July last, observed the formation of a volatile oily substance in a solution of nitrate of ammonia, exposed to chlorine in the state of gas. In repeating the experiment, the author perceived first an oily film on the surface of the fluid, which gradually collected into small globules, and fell to the bottom. One of these globules being taken out while floating on the surface of the water, and slightly warmed, exploded with brilliant light, but without any violence of detonation.

In a series of experiments carried on jointly with Mr. Children and Mr. Warburton, other ammoniacal solutions were substituted, and it was found that the same product was obtained by means of oxalate of ammonia, or by a weak solution of pure ammonia. The first instance that occurred of violent explosion, was in their endeavours to form larger quantities in a Wolfe's apparatus, by a series of bottles containing the different solutions.

The heat generated by the union of ammoniacal vapour and chlorine, caused the destruction of the whole apparatus by an instantaneous explosion.

From this time their attempts to form the oil were confined to small phials of the gas, and their trials of its properties were limited to a quantity not greater than a grain of mustard-seed; but still the results were attended with danger. In attempting to collect the gas produced in its explosion, by heating a very small quantity under water in a curved tube, the tube was shattered with great violence, and the author received a wound in the transparent cornea of one eye, from which he has not yet recovered.

Explosions equally violent were afterwards witnessed by Mr. Children and Mr. Warburton, even without confinement: when a small globule of the oil was thrown into a glass of olive oil, oil of turpentine, or naphtha, the glass, though strong, was in each instance shivered to pieces.

When a globule larger than a grain of mustard-seed was touched under water by phosphorus, the explosion was so violent as to break any glass vessel in which the experiment was made. But when smaller quantities were employed, a gas could be collected which, by the experiments hitherto made, contains no oxygen and no inflammable gas.

When thrown into the solutions of phosphorus, in ether, or alcohol, it detonates most violently; but neither ether nor alcohol alone exhibit any violence in their action upon it.

In muriatic acid it gives off gas rapidly, and disappears without explosion. Various experiments were also instituted with other substances, as sulphur and resin, among others, but without any remarkable effects.

From the general tenour of these experiments, the author thinks it probable that the substance here examined is a compound of azote and chlorine, formed by the decomposition of ammonia; while the hydrogen of the ammonia unites with another portion of chlorine, and forms muriatic acid.

The heat and light produced during the expansion of this oil into gaseous matter, is considered by the author to be without a parallel in our present collection of chemical facts; and the suddenness of the explosion more instantaneous than that of any compound hitherto known.

On a remarkable Application of Cotes's Theorem. By J. F. W. Herschel, Esq. Communicated by W. Herschel, LL.D. F.R.S. Read November 12, 1812. [Phil. Trans. 1813, p. 8.]

This communication includes an application of Cotes's theorem to conic sections in general; but the application noticed in the title relates to the parabola in particular, and it may be thus enunciated.

If any number of radii vectores SP be drawn from the focus to the curve, making equal angles PSP with each other; and if an equal